

WHAT IS CLAIMED IS:

1. A laser scanning microscope comprising:
  - a first optical scanning system which scans a first laser light having a spectrum in a visible range  
5 on a sample to excite fluorescence;
  - a first dichroic mirror which separates the fluorescence from the sample from an optical path of the first laser light;
  - a photodetector which detects the fluorescence  
10 separated by the first dichroic mirror;
  - an emission filter which is disposed between the first dichroic mirror and photodetector to cut off the first laser light and to transmit desired fluorescence;
  - a second optical scanning system which introduces  
15 a second laser light having the spectrum in an ultraviolet or infrared region into a specific portion on the sample; and
  - a laser cut filter which is disposed between the first dichroic mirror and photodetector to limit  
20 transmission of the second laser light.
2. The laser scanning microscope according to claim 1, wherein a plurality of photodetectors and emission filters are disposed,
  - a second dichroic mirror which splits the  
25 fluorescence from the sample toward these photodetectors is disposed between the first dichroic mirror and photodetector,

the laser cut filter is disposed between the first and second dichroic mirrors, and

the emission filter is disposed between the respective photodetectors and the second dichroic mirror.

3. The laser scanning microscope according to claim 1, further comprising:

a wavelength change section which changes a wavelength of the second laser light; and

a filter change section which changes the laser cut filter in accordance with the wavelength of the second laser light.

4. The laser scanning microscope according to claim 1, wherein the second optical scanning system is attachable/detachable with respect to a main body of the laser scanning microscope including the first optical scanning system.

5. The laser scanning microscope according to claim 1, wherein a transmittance of the first laser light of the emission filter is 0.01% or less, and

a transmittance of the second laser light of the laser cut filter is 0.01% or less.

6. A laser scanning microscope comprising:

a first optical scanning system which scans a first laser light for observing a sample on the sample; a first light branch device which branches a light from the sample from an optical path of the first laser

light;

a photodetector which detects the light from the sample separated by the first light branch device;

5 a second optical scanning system which irradiates a specific portion on the sample with a second laser light for stimulating or operating the sample; and

a wavelength selection device which is disposed between the first light branch device and photodetector and which includes a first function of transmitting a  
10 desired observation light and a second function of limiting transmission of the second laser light.

7. The laser scanning microscope according to claim 6, wherein the wavelength selection device is an interference filter.

15 8. The laser scanning microscope according to claim 6, wherein a transmittance of the second laser light of the wavelength selection device is 0.01% or less.

20 9. The laser scanning microscope according to claim 8, wherein the wavelength selection device comprises: a first interference filter which includes the first function; and a second interference filter which includes the second function.

25 10. The laser scanning microscope according to claim 8, wherein the wavelength selection device is an interference filter comprising: a first interference coating which fulfills the first function on one

surface of a substrate; and a second interference coating which fulfills the second function on the other surface.

11. The laser scanning microscope according to  
5 claim 8, wherein the second laser light is an ultraviolet or infrared light.

12. The laser scanning microscope according to  
claim 7, wherein the wavelength selection device  
comprises: a first interference filter which includes  
10 the first function; and a second interference filter  
which includes the second function.

13. The laser scanning microscope according to  
claim 12, wherein a plurality of photodetectors and  
first interference filters are disposed,  
15 a second light branch device which splits the  
light from the sample toward these photodetectors is  
disposed between the first light branch device and  
photodetector,

the second interference filter is disposed between  
20 the first and second light branch devices, and

the first interference filter is disposed between  
the respective photodetectors and the second light  
branch device.

14. The laser scanning microscope according to  
25 claim 12, further comprising:

a wavelength change section which changes a  
wavelength of the second laser light; and

a filter change section which changes the second interference filter in accordance with the wavelength of the second laser light.

15        15. The laser scanning microscope according to claim 7, wherein the wavelength selection device comprises: a first interference coating which includes the first function; and a second interference coating which includes the second function.

10        16. The laser scanning microscope according to claim 6, wherein the second laser light is an ultraviolet or infrared light.

15        17. The laser scanning microscope according to claim 16, wherein the wavelength selection device comprises: a first interference filter which includes the first function; and a second interference filter which includes the second function.

18. The laser scanning microscope according to claim 17, wherein a plurality of photodetectors and first interference filters are disposed,

20        a second light branch device which splits the light from the sample toward these photodetectors is disposed between the first light branch device and photodetector,

25        the second interference filter is disposed between the first and second light branch devices, and

the first interference filter is disposed between the respective photodetectors and the second light

branch device.

19. The laser scanning microscope according to claim 6, wherein the desired observation light is a fluorescence excited by the first laser light.